

This listing of claims will replace all prior versions, and listings, of claims in the application:

1 Claim 1 (currently amended): An apparatus for performing low
2 density parity check encoding operations, the apparatus
3 comprising:
4 memory including a set of memory locations for storing
5 L sets of Z-bit vectors, where Z is a positive integer greater
6 than one and L is a positive integer;
7 a vector unit operation processor including a circuit
8 for performing Z parity calculations in parallel to compute a Z-
9 bit vector, each bit of the computed Z-bit vector being
10 generated by one of the Z parity calculations, an accumulator
11 for storing the computed Z-bit vector, and an output device for
12 passing the computed Z-bit vector to the said memory in response
13 to operation instructions; and
14 a switching reordering device coupled to the memory
15 and to the vector unit operation processor, the switching
16 reordering device for passing a Z-bit vectors vector between
17 said memory and said vector unit operation processor and for
18 performing a bit level reordering operation on elements of at
19 least one Z-bit vector, in response to switch reordering control
20 information, as the at least one Z-bit vector is passed between
21 said memory and said vector unit operation processor by said
22 reordering device.

1 Claim 2 (original): The apparatus of claim 1, further
2 comprising:
3 an ordering control module coupled to said memory for
4 generating read and write indices; and
5 an operation control module coupled to said vector
6 unit operation processor for generating unit operation
7 instructions.

1 Claim 3 (currently amended): The apparatus of claim 2, wherein
2 the ordering control module is further coupled to said
3 reordering switch device for generating said reordering switch

4 control information used to control the switching of reordering
5 for said at least one Z-bit vector.

1 Claim 4 (currently amended): The apparatus of claim 1, wherein
2 the switching reordering device includes circuitry for
3 performing a vector rotation element reordering operation that
4 includes a bitwise rotation operation to generate a reordered
5 rotated Z-bit vector.

1 Claim 5 (currently amended): The apparatus of claim 2, wherein
2 the ordering control module stores information on the order of
3 the Z-bit vectors are to be read out of the memory and
4 information on the order of the Z-bit vectors are to be written
5 into the memory.

1 Claim 6 (currently amended): The apparatus of claim 5 2,
2 wherein the ordering control module further stores bitwise
3 rotation operation information on the rotation to be used in
4 generating said re-ordering control information performed on the
5 read out vectors from said memory by said switch.

1 Claim 7 (original): The apparatus of claim 2, wherein the
2 ordering control module sequentially generates index
3 identifiers, each identifier controlling the memory to access
4 memory locations corresponding to a vector as part of a single
5 SIMD instruction.

1 Claim 8 (original): The apparatus of claim 7, wherein each
2 identifier is a single memory address.

1 Claim 9 (original): The apparatus of claim 2, wherein said
2 operation control module stores operation instructions, each
3 instruction controlling the operation at said vector unit
4 operation processor.

1 Claim 10 (original): The apparatus of claim 9, wherein the
2 operation control module sequentially generates operation

3 instructions, each instruction controlling said vector unit
4 operation processor to perform instructed operations.

1 Claim 11 (currently amended): The apparatus of claim 4, further comprising:
2 further comprising an encoder control module coupled to said
3 ordering control module, the encoder control module including
4 means for supplying information to said ordering control module
5 used to control the order in which each of the L Z-bit vectors
6 is to be read out of said memory, their associated reorderings
7 rotations, and the order to be written into said memory.

1 Claim 12 (currently amended): The apparatus of claim 11,
2 wherein the encoder control module device is further coupled to
3 said operation control module, the encoder control device
4 including means for supplying information to said operation
5 control module used to generate operation instructions.

1 Claim 13 (currently amended): A method of performing low
2 density parity check encoding operations, the method comprising:

3 storing L sets of Z-bit vectors in a memory device,
4 where Z is a positive integer greater than one and L is a
5 positive integer;

6 reading one of said sets of Z-bit L stored Z-bit
7 vectors from said memory device stored L sets of Z-bit vectors;
8 rotating performing a bit level reordering of the bits
9 in said read one of said Z-bit Z-bit vectors; and

10 operating a vector unit processor to perform a
11 plurality of parity check combining operations in parallel to
12 combine the bits of the rotated reordered Z-bit Z-bit vector
13 with a Z-bit vector stored in said vector unit processor to
14 generate a new Z-bit vector.

1 Claim 14 (currently amended): The method of claim 13, further
2 comprising:

3 storing said new z-bit z-bit vector in said memory device
4 in the place of one of the L stored L sets of z-bit z-bit
5 vectors.

1 Claim 15 (currently amended): The method of claim 14, wherein
2 said parity check combining operations performed by said vector
3 unit processor are exclusive OR operations.

1 Claim 16 (currently amended): The method of claim 15 A method
2 of performing encoding operations, the method comprising:
3 storing L z-bit vectors in a memory device, where Z is
4 a positive integer greater than one and L is a positive integer;
5 reading one of said L stored z-bit vectors from said
6 memory device;
7 reordering the bits in said read one of said z-bit
8 vectors; and
9 operating a vector unit processor to perform a
10 plurality of combining operations to combine the bits of the
11 reordered z-bit vector with a z-bit vector stored in said vector
12 unit processor to generate a new Z-bit vector
13 storing said new Z-bit vector in said memory device in the
14 place of one of the L stored z-bit vectors
15 wherein said combining operations performed by said vector
16 unit processor are exclusive OR operations; and
17 wherein said encoding method is a low density parity check
18 encoding method.

1 Claim 17 (currently amended): The method of claim 14, further
2 comprising:

3 executing a set of stored machine executable
4 instructions to control the rotation reordering of the read z
5 bit vector, said reordering including a rotation operation.

1 Claim 18 (currently amended): The method of claim 14, further
2 comprising:

3 using the executed set of stored machine executable
4 instructions to determine which one of said L sets of stored z
5 bit z-bit vectors is to be read from memory.

1 Claim 19 (currently amended): The method of claim 14, further
2 comprising:

3 using the executed set of stored machine executable
4 instructions to determine when one of said sets of L stored z
5 bit z-bit vectors is to be read from memory.

1 Claim 20 (currently amended): The method of claim 19, further
2 comprising:

3 using the executed set of stored machine executable
4 instructions to determine which one of the L stored L-sets-of-z
5 bit z-bit vectors is to be replaced by storing the new z-bit z-
6 bit vector in said memory device.

1 Claim 21 (currently amended): The method of claim 19, further
2 comprising:

3 resetting the z-bit z-bit vector stored in said vector unit
4 processor at the same time said new z-bit z-bit vector is
5 stored.

1 Claim 22 (currently amended): The method of claim 14, further
2 comprising:

3 resetting the z-bit z-bit vector stored in said vector unit
4 processor at the same time said new z-bit z-bit vector is
5 stored.

1 Claim 23 (currently amended): The method of claim 14, further
2 comprising:

3 using the executed set of stored machine executable
4 instructions to determine which one of the L stored L-sets-of-z
5 bit z-bit vectors is to be replaced by storing the new z-bit z-
6 bit vector in said memory device.

1 Claim 24 (currently amended): A method of performing low
2 density parity check encoding operations, the method comprising:

3 storing L sets of Z-bit vectors in a memory device,
4 where Z is a positive integer greater than one and L is a
5 positive integer;

6 reading one of said sets of Z bit vectors from said
7 stored L sets of Z-bit Z-bit vectors;

8 operating a vector unit processor to perform a
9 plurality of parity check combining operations in parallel to
10 combine the bits of the rotated Z-bit read Z-bit vector with a
11 Z-bit vector stored in said vector unit processor to generate a
12 new Z-bit vector;

13 rotating reordering the bits in said new Z-bit Z-bit
14 vector by performing a bit level reordering of bits in the new
15 Z-bit vector to produce a reordered Z-bit vector; and

16 storing said reordered rotated new Z-bit Z-bit vector
17 in said memory device in the place of one of the L stored L sets
18 of Z-bit Z-bit vectors.

1 Claim 25 (currently amended): The method of claim 24, A method
2 of performing encoding operations, the method comprising:

3 storing L Z-bit vectors in a memory device, where Z is
4 a positive integer greater than one and L is a positive integer;

5 reading one of said Z-bit vectors from said L stored
6 Z-bit vectors;

7 operating a vector unit processor to perform a
8 plurality of combining operations to combine the bits of the
9 read Z-bit vector with a Z-bit vector stored in said vector unit
10 processor to generate a new Z-bit vector;

11 reordering the bits in said new Z-bit vector by cyclicly
12 shifting the position of bits in the new Z-bit vector to
13 implement a cyclic shift operation that produces a reordered Z-
14 bit vector; and

15 storing said reordered Z-bit vector in said memory
16 device in the place of one of the L stored Z-bit vectors;

17 wherein said combining operations performed by said vector
18 unit processor are exclusive OR operations; and
19 wherein said encoding method is a low density parity check
20 encoding method.

1 Claim 26 (currently amended): The method of claim 25, further
2 comprising:

3 executing a set of stored machine executable
4 instructions to control the reordering ~~rotation~~ of the read ~~z~~
5 ~~bit~~ z-bit vector and to determine which one of the ~~L~~ stored ~~z~~
6 ~~sets of z-bit z-bit~~ vectors is to be replaced by storing said
7 ~~rotated new z-bit~~ reordered z-bit vector in said memory device.

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